1η εργασία

**27/03/18**

**Ecology**

Respect the delicate ecology of your delusions

Levels, scope, and scale of organization

The scope of ecology contains a wide array of interacting levels of organization spanning micro-level (e.g., [cells](https://en.wikipedia.org/wiki/Cell_(biology))) to a planetary scale (e.g., [biosphere](https://en.wikipedia.org/wiki/Earth%27s_spheres)) [phenomena](https://en.wikipedia.org/wiki/Phenomena). Ecosystems, for example, contain biotic [resources](https://en.wikipedia.org/wiki/Resource_(biology)) and interacting life forms (i.e., individual organisms that aggregate into [populations](https://en.wikipedia.org/wiki/Population) which aggregate into distinct ecological communities). Ecosystems are dynamic, they do not always follow a linear succession path, but they are always changing, sometimes rapidly and sometimes so slowly that it can take thousands of years for ecological processes to bring about certain [succession stages](https://en.wikipedia.org/wiki/Ecological_succession) of a forest. An ecosystem's area can vary greatly, from tiny to vast. A single tree is of little consequence to the classification of a forest ecosystem, but critically relevant to organisms living in and on it. Several generations of an [aphid](https://en.wikipedia.org/wiki/Aphid) population can exist over the lifespan of a single leaf. Each of those aphids, in turn, support diverse bacterial communities. The nature of connections in ecological communities cannot be explained by knowing the details of each species in isolation, because the emergent pattern is neither revealed nor predicted until the ecosystem is studied as an integrated whole. Some ecological principles, however, do exhibit collective properties where the sum of the components explain the properties of the whole, such as birth rates of a population being equal to the sum of individual births over a designated time frame.

Hierarchy

The scale of ecological dynamics can operate like a closed system, such as aphids migrating on a single tree, while at the same time remain open with regard to broader scale influences, such as atmosphere or climate. Hence, ecologists classify [ecosystems](https://en.wikipedia.org/wiki/Ecosystems) hierarchically by analyzing data collected from finer scale units, such as vegetation associations, climate, and soil types, and integrate this information to identify emergent patterns of uniform organization and processes that operate on local to regional, [landscape](https://en.wikipedia.org/wiki/Landscape), and chronological scales. To structure the study of ecology into a conceptually manageable framework, the biological world is organized into a [nested hierarchy](https://en.wikipedia.org/wiki/Biological_classification), ranging in scale from [genes](https://en.wikipedia.org/wiki/Gene), to [cells](https://en.wikipedia.org/wiki/Cell_(biology)), to [tissues](https://en.wikipedia.org/wiki/Tissue_(biology)), to [organs](https://en.wikipedia.org/wiki/Organ_(anatomy)), to [organisms](https://en.wikipedia.org/wiki/Organism), to [species](https://en.wikipedia.org/wiki/Species), to [populations](https://en.wikipedia.org/wiki/Population_ecology), to [communities](https://en.wikipedia.org/wiki/Community_(ecology)), to [ecosystems](https://en.wikipedia.org/wiki/Ecosystem), to [biomes](https://en.wikipedia.org/wiki/Biome), and up to the level of the [biosphere](https://en.wikipedia.org/wiki/Biosphere). This framework forms a [panarchy](https://en.wikipedia.org/wiki/Panarchy) and exhibits [non-linear](https://en.wikipedia.org/wiki/Non-linear) behaviors; this means that "effect and cause are disproportionate, so that small changes to critical variables, such as the number of [nitrogen fixers](https://en.wikipedia.org/wiki/Nitrogen_fixation), can lead to disproportionate, perhaps irreversible, changes in the system properties."

Biodiversity

Biodiversity (an abbreviation of "biological diversity") describes the diversity of life from genes to ecosystems and spans every level of biological organization. The term has several interpretations, and there are many ways to index, measure, characterize, and represent its complex organization. Biodiversity includes [species diversity](https://en.wikipedia.org/wiki/Species_diversity), [ecosystem diversity](https://en.wikipedia.org/wiki/Ecosystem_diversity), and [genetic diversity](https://en.wikipedia.org/wiki/Genetic_diversity) and scientists are interested in the way that this diversity affects the complex ecological processes operating at and among these respective levels.Biodiversity plays an important role in [ecosystem services](https://en.wikipedia.org/wiki/Ecosystem_service) which by definition maintain and improve human quality of life.Conservation priorities and management techniques require different approaches and considerations to address the full ecological scope of biodiversity. [Natural capital](https://en.wikipedia.org/wiki/Natural_capital) that supports populations is critical for maintaining [ecosystem services](https://en.wikipedia.org/wiki/Ecosystem_services)[[19]](https://en.wikipedia.org/wiki/Ecology#cite_note-Ceballos02-19)[[20]](https://en.wikipedia.org/wiki/Ecology#cite_note-Palumbi09-20) and species [migration](https://en.wikipedia.org/wiki/Animal_migration) (e.g., riverine fish runs and avian insect control) has been implicated as one mechanism by which those service losses are experienced. An understanding of biodiversity has practical applications for species and ecosystem-level conservation planners as they make management recommendations to consulting firms, governments, and industry.[[](https://en.wikipedia.org/wiki/Ecology#cite_note-Hammond09-22)

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| **LESSON** | **TOPIC** | **ASSIGNMENT** | **Points** | **DUE** |
| **1** | **What is Distance Learnig?** | **Wiki #1** | **10** | **March 10** |
| **Presentation** | **20** |  |
| **2** | **History& Theories** | **Brief Paper** | **20** | **March 24** |
| **Spring Break** | | | | |
| **3** | **Distance Learners** | **Discussion #1** | **10** | **April 7** |
| **Group Project** | **50** | **April 14** |
| **4** | **Media Selection** | **Blog #1** | **10** | **April 21** |



Habitat

The habitat of a species describes the environment over which a species is known to occur and the type of community that is formed as a result.More specifically, "habitats can be defined as regionsin environmental space that are composed of multiple dimensions, each representing a biotic or abiotic environmental variable; that is, any component or characteristic of the environment related directly (e.g. forage biomass and quality) or indirectly (e.g. elevation) to the use of a location by the animal."For example, a habitat might be an aquatic or terrestrial environment that can be further categorized as a [montane](https://en.wikipedia.org/wiki/Montane_ecosystem) or [alpine](https://en.wikipedia.org/wiki/Alpine_tundra) ecosystem. Habitat shifts provide important evidence of competition in nature where one population changes relative to the habitats that most other individuals of the species occupy. For example, one population of a species of tropical lizards (*Tropidurus hispidus*) has a flattened body relative to the main populations that live in open savanna. The population that lives in an isolated rock outcrop hides in crevasses where its flattened body offers a selective advantage. Habitat shifts also occur in the developmental life history of amphibians, and in insects that transition from aquatic to terrestrial habitats. [Biotope](https://en.wikipedia.org/wiki/Biotope) and habitat are sometimes used interchangeably, but the former applies to a community's environment, whereas the latter applies to a species' environment.

Niche

[Biogeographical](https://en.wikipedia.org/wiki/Biogeography) patterns and [range](https://en.wikipedia.org/wiki/Range_(biology)) distributions are explained or predicted through knowledge of a species' [traits](https://en.wikipedia.org/wiki/Trait_(biology)) and niche requirements. Species have functional traits that are uniquely adapted to the ecological niche. A trait is measurable property, [phenotype](https://en.wikipedia.org/wiki/Phenotype), or [characteristic](https://en.wikipedia.org/wiki/Phenotypic_trait) of an organism that may influence its survival. Genes play an important role in the interplay of development and environmental expression of traits. Resident species evolve traits that are fitted to the selection pressures of their local environment. This tends to afford them a competitive advantage and discourages similarly adapted species from having an overlapping geographic range. The [competitive exclusion principle](https://en.wikipedia.org/wiki/Competitive_exclusion_principle) states that two species cannot coexist indefinitely by living off the same limiting [resource](https://en.wikipedia.org/wiki/Resource_(biology)); one will always out-compete the other. When similarly adapted species overlap geographically, closer inspection reveals subtle ecological differences in their habitat or dietary requirements.[Some models and empirical studies, however, suggest that disturbances can stabilize the co-evolution and shared niche occupancy of similar species inhabiting species-rich communities. The habitat plus the niche is called the [ecotope](https://en.wikipedia.org/wiki/Ecotope), which is defined as the full range of environmental and biological variables affecting an entire species.

Η οικογένεια μου